Fig. 1A

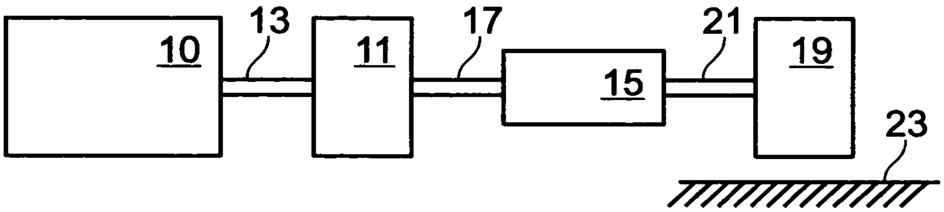


Fig. 4

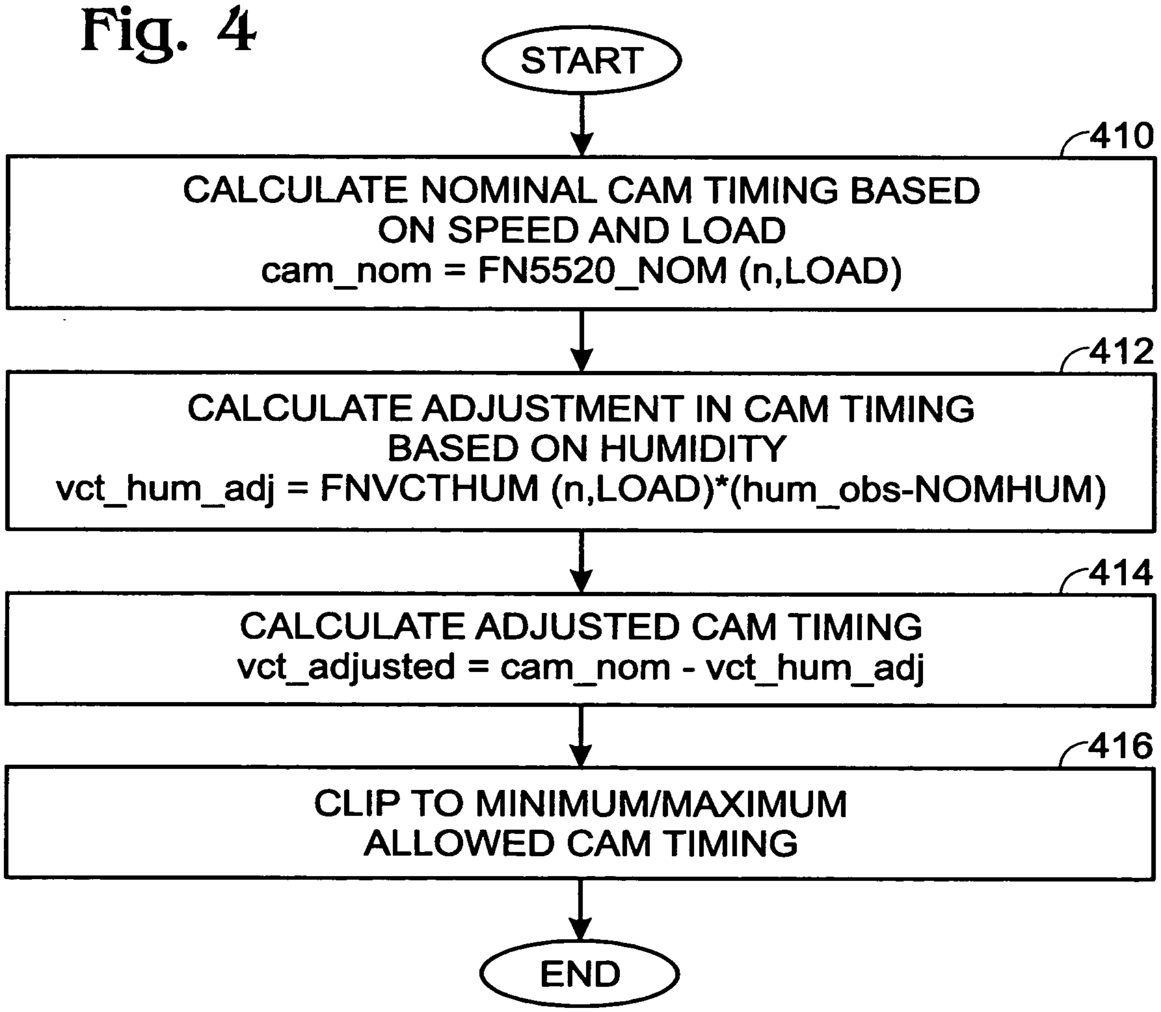

START
410
CALCULATE NOMINAL CAM TIMING BASED ON SPEED AND LOAD
cam_nom = FN5520_NOM (n,LOAD)
412
CALCULATE ADJUSTMENT IN CAM TIMING BASED ON HUMIDITY
vct_hum_adj = FNVCTHUM (n,LOAD)*(hum_obs-NOMHUM)
414
CALCULATE ADJUSTED CAM TIMING
vct_adjusted = cam_nom - vct_hum_adj
416
CLIP TO MINIMUM/MAXIMUM ALLOWED CAM TIMING
END

Fig. 1B

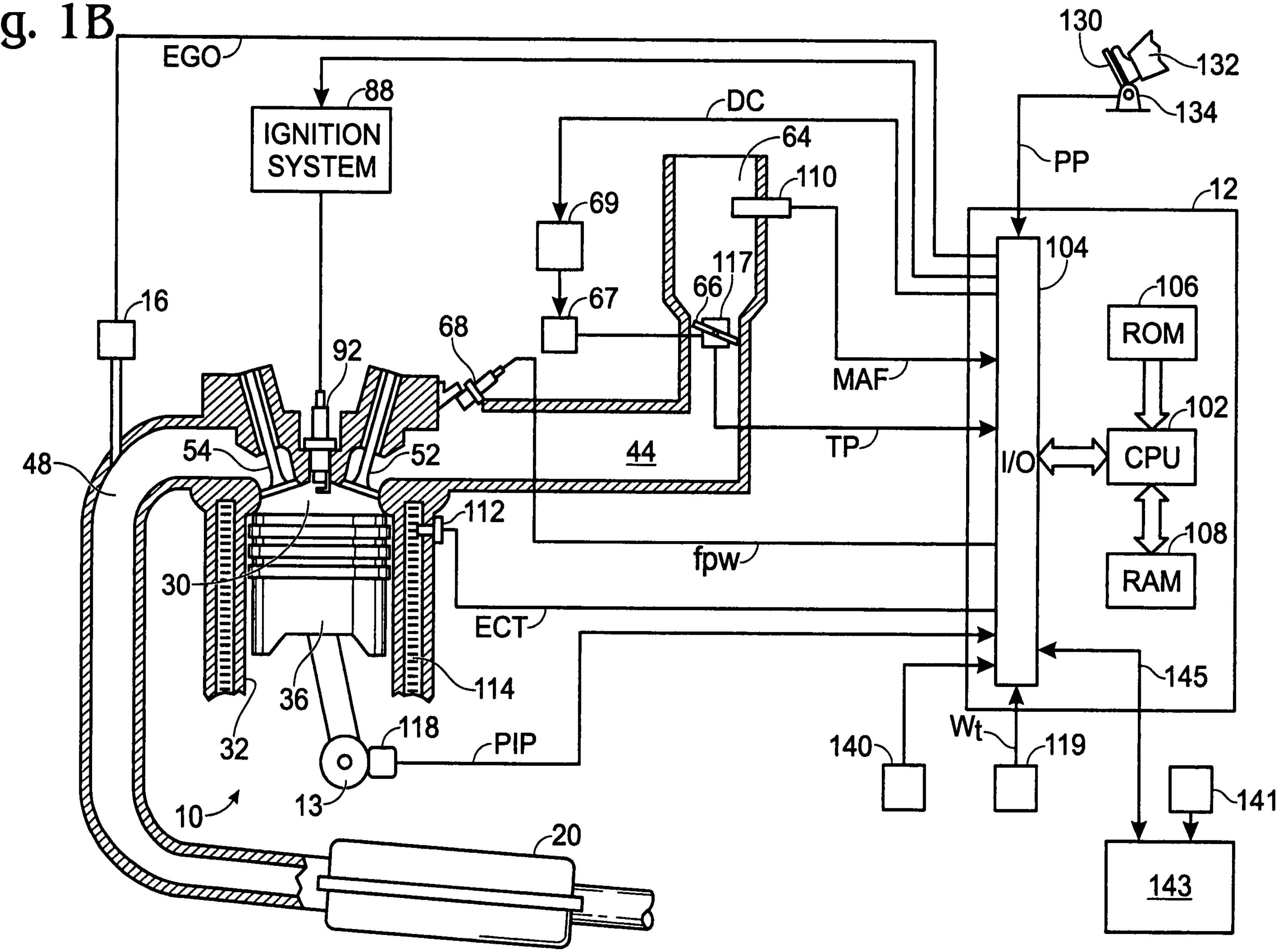

EGO
IGNITION SYSTEM
DC
PP
ROM
CPU
RAM
I/O
MAF
TP
fpw
ECT
PIP
Wt

Fig. 2

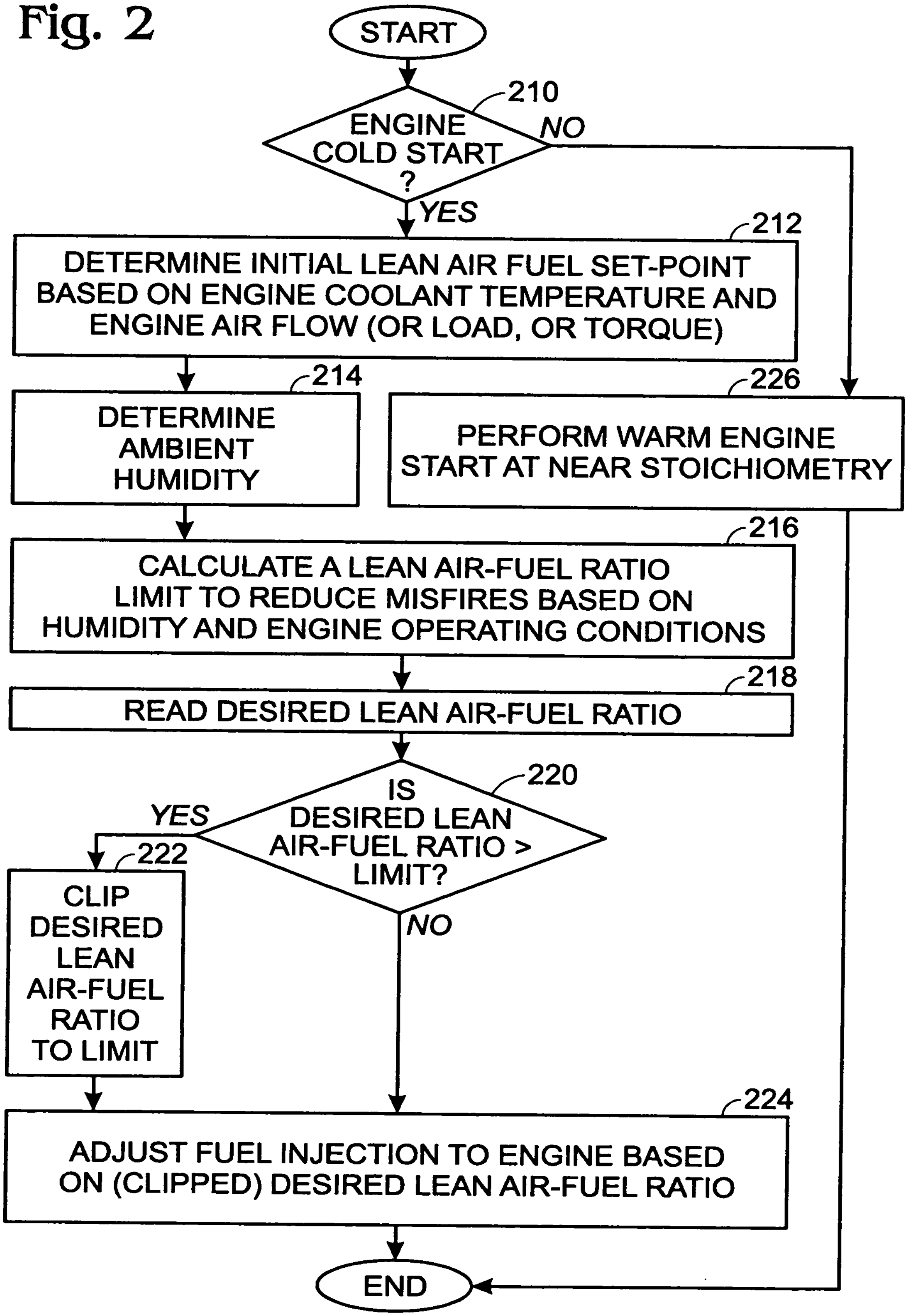

START
ENGINE COLD START ?
210
NO
YES
212
DETERMINE INITIAL LEAN AIR FUEL SET-POINT BASED ON ENGINE COOLANT TEMPERATURE AND ENGINE AIR FLOW (OR LOAD, OR TORQUE)
214
DETERMINE AMBIENT HUMIDITY
226
PERFORM WARM ENGINE START AT NEAR STOICHIOMETRY
216
CALCULATE A LEAN AIR-FUEL RATIO LIMIT TO REDUCE MISFIRES BASED ON HUMIDITY AND ENGINE OPERATING CONDITIONS
218
READ DESIRED LEAN AIR-FUEL RATIO
220
IS DESIRED LEAN AIR-FUEL RATIO > LIMIT?
YES
222
CLIP DESIRED LEAN AIR-FUEL RATIO TO LIMIT
NO
224
ADJUST FUEL INJECTION TO ENGINE BASED ON (CLIPPED) DESIRED LEAN AIR-FUEL RATIO
END

Fig. 3

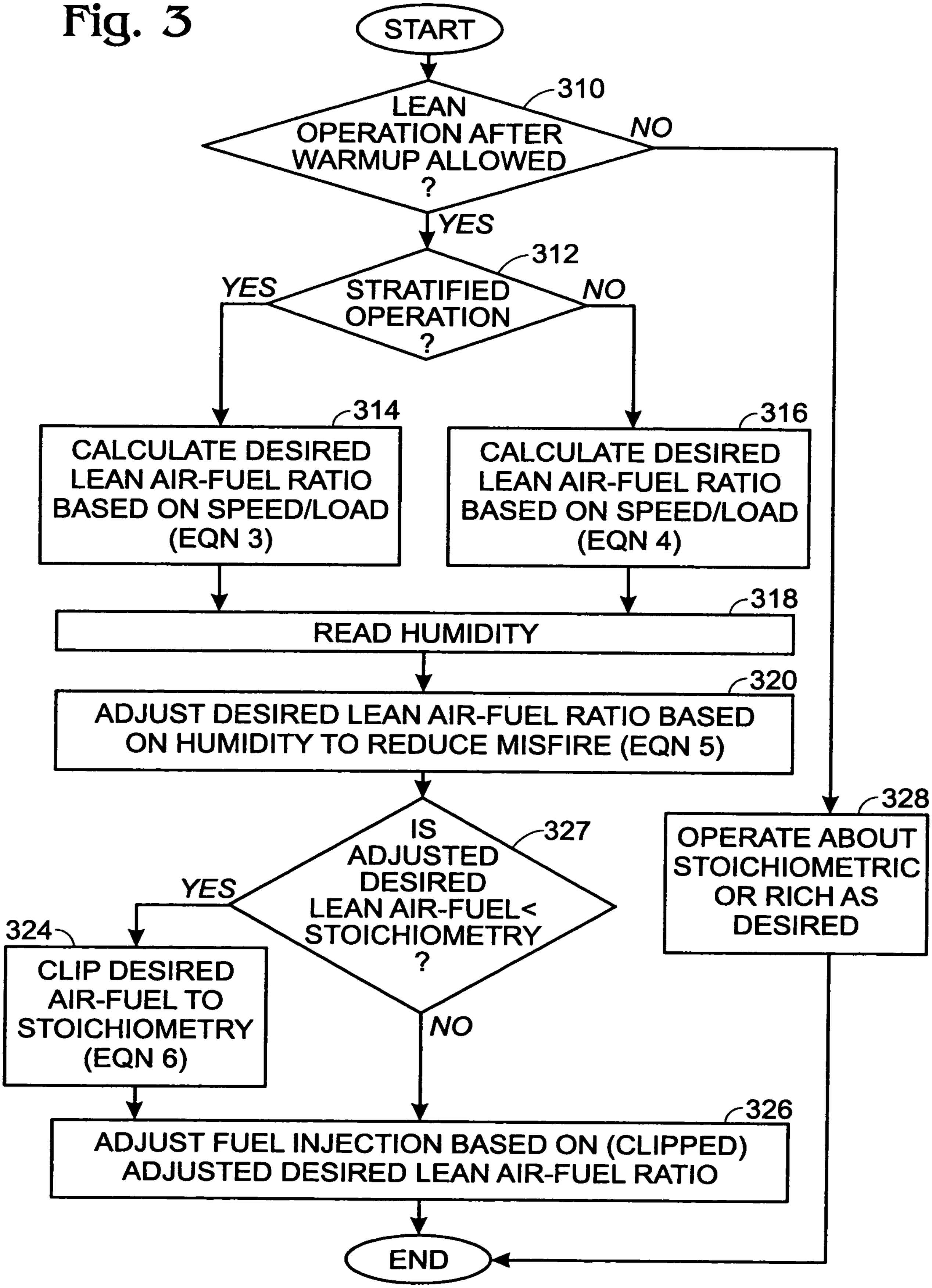

START
LEAN OPERATION AFTER WARMUP ALLOWED ?
310
NO
YES
STRATIFIED OPERATION ?
312
YES
NO
CALCULATE DESIRED LEAN AIR-FUEL RATIO BASED ON SPEED/LOAD (EQN 3)
314
CALCULATE DESIRED LEAN AIR-FUEL RATIO BASED ON SPEED/LOAD (EQN 4)
316
READ HUMIDITY
318
ADJUST DESIRED LEAN AIR-FUEL RATIO BASED ON HUMIDITY TO REDUCE MISFIRE (EQN 5)
320
IS ADJUSTED DESIRED LEAN AIR-FUEL< STOICHIOMETRY ?
327
YES
NO
CLIP DESIRED AIR-FUEL TO STOICHIOMETRY (EQN 6)
324
OPERATE ABOUT STOICHIOMETRIC OR RICH AS DESIRED
328
ADJUST FUEL INJECTION BASED ON (CLIPPED) ADJUSTED DESIRED LEAN AIR-FUEL RATIO
326
END

Fig. 5

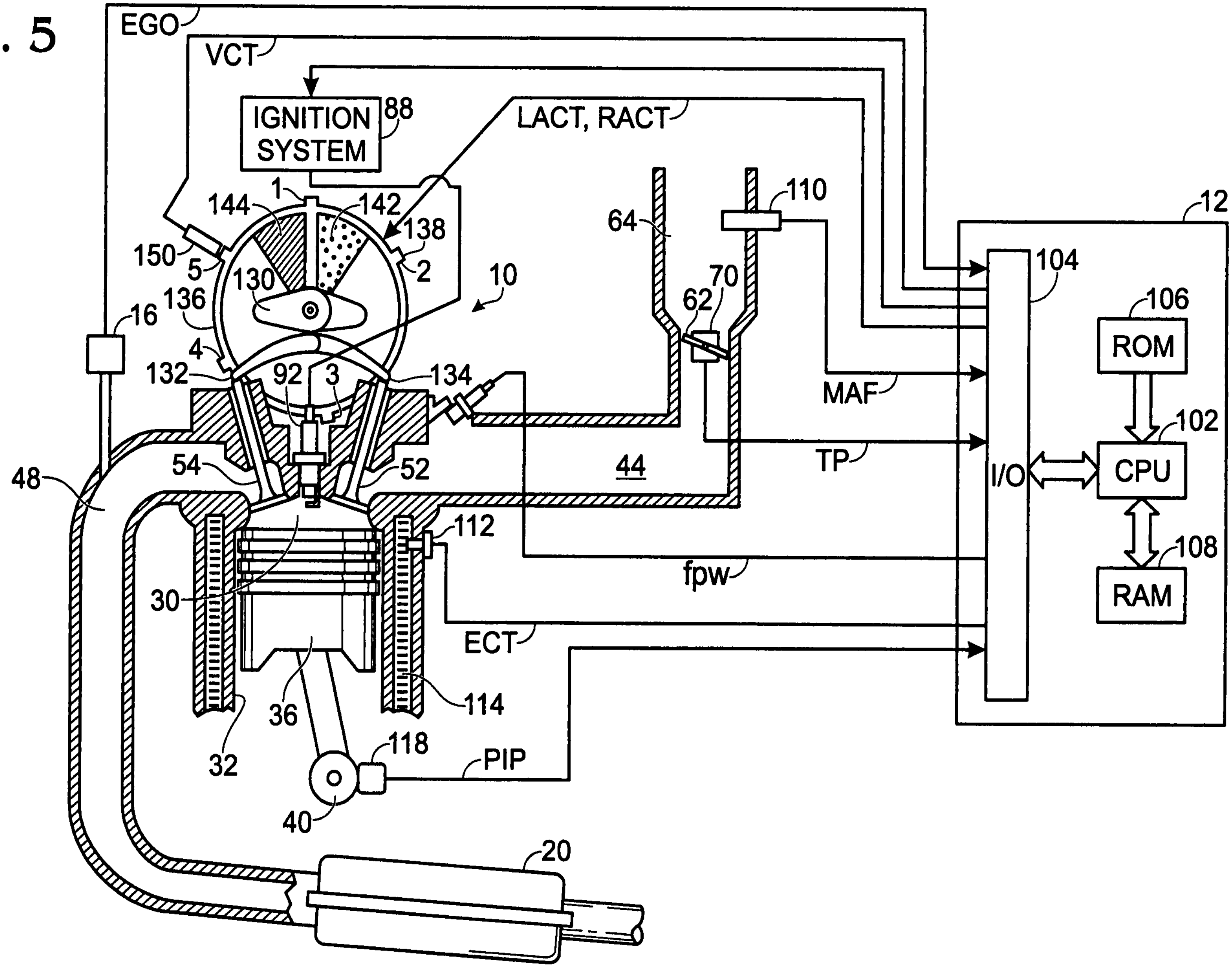

EGO
VCT
IGNITION SYSTEM
LACT, RACT
ROM
CPU
I/O
RAM
MAF
TP
fpw
ECT
PIP

Fig. 6

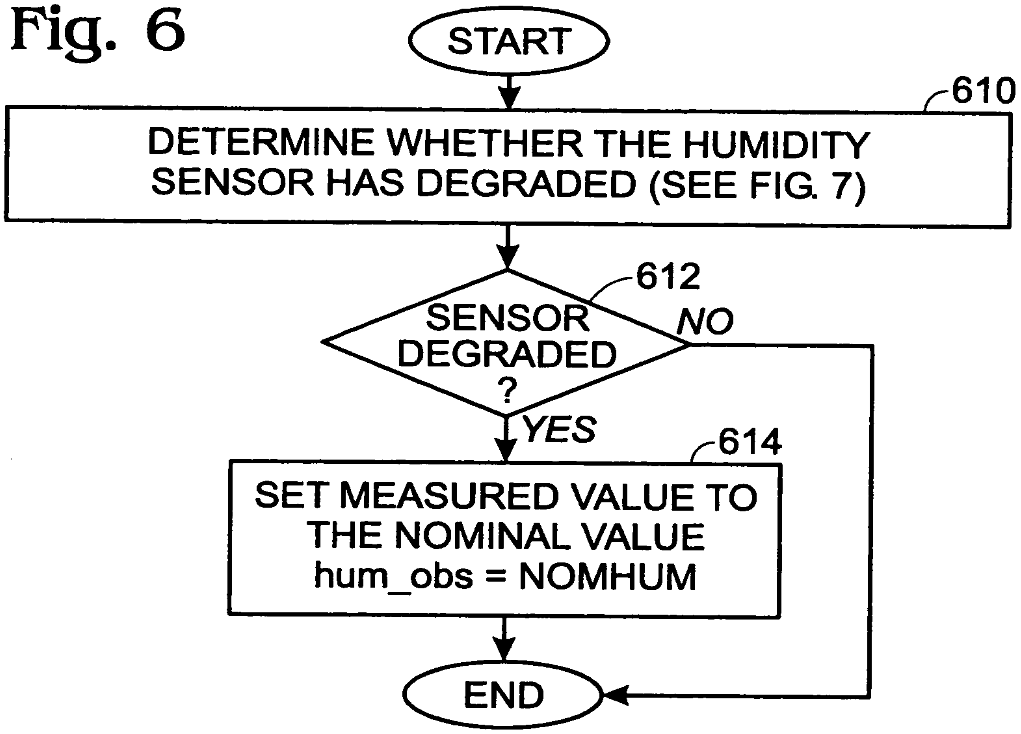

START
610
DETERMINE WHETHER THE HUMIDITY SENSOR HAS DEGRADED (SEE FIG. 7)
612
SENSOR DEGRADED ?
NO
YES
614
SET MEASURED VALUE TO THE NOMINAL VALUE
hum_obs = NOMHUM
END

Fig. 7

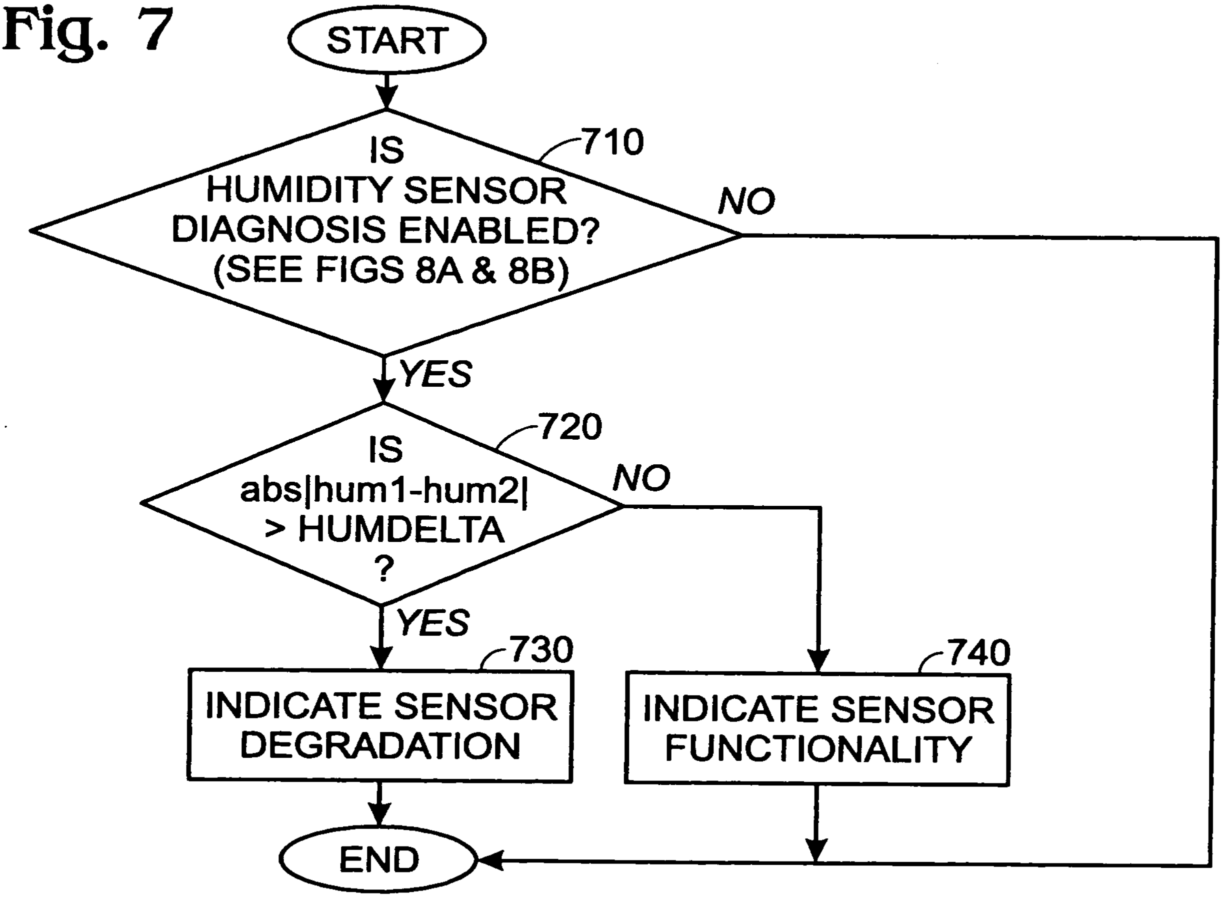

START
710
IS HUMIDITY SENSOR DIAGNOSIS ENABLED? (SEE FIGS 8A & 8B)
NO
YES
720
IS abs|hum1-hum2| > HUMDELTA ?
NO
YES
730
INDICATE SENSOR DEGRADATION
740
INDICATE SENSOR FUNCTIONALITY
END

Fig. 8A

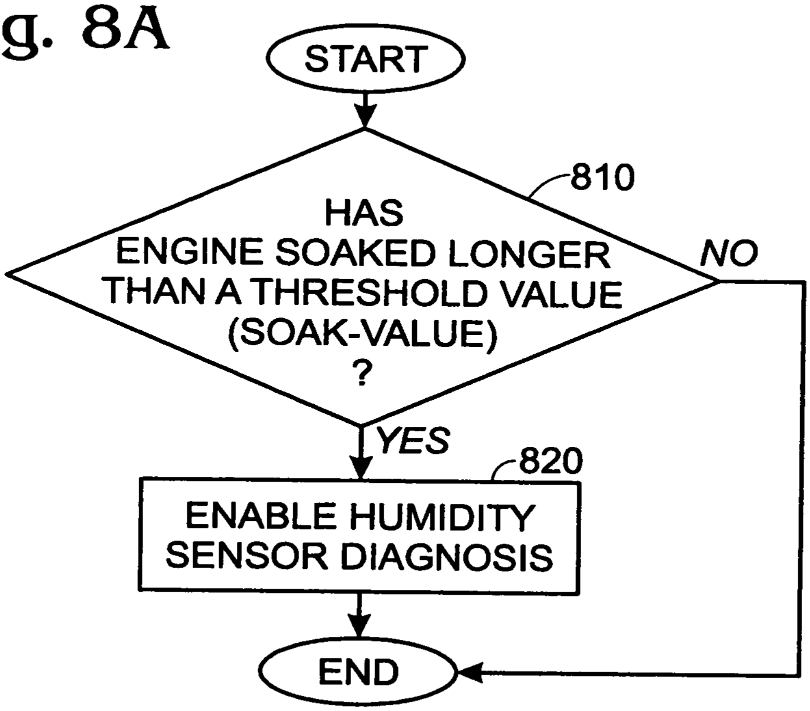
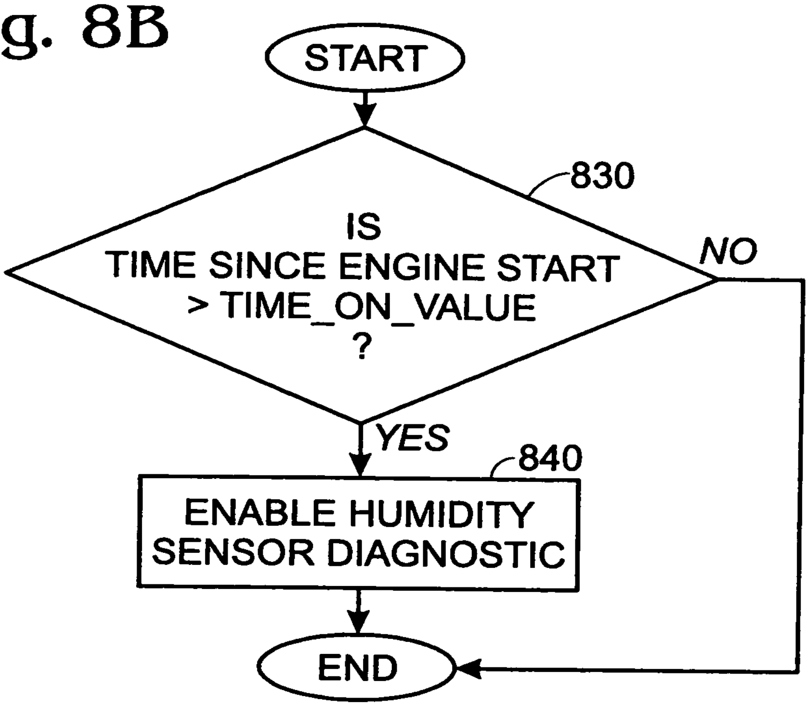

START
810
HAS ENGINE SOAKED LONGER THAN A THRESHOLD VALUE (SOAK-VALUE) ?
NO
YES
820
ENABLE HUMIDITY SENSOR DIAGNOSIS
END

Fig. 8B


START
830
IS TIME SINCE ENGINE START > TIME_ON_VALUE ?
NO
YES
840
ENABLE HUMIDITY SENSOR DIAGNOSTIC
END